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João Pedro Rosa de Oliveira

Vascular Access for Elderly Hemodialysis Patients

Acessos Vasculares em Doentes Idosos em Hemodiálise

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DESIGNAÇÃO DA ÁREA DO PROJECTO

Medicina - Nefrologia

~~TÍTULO DISSERTAÇÃO~~/MONOGRAFIA (riscar o que não interessa)

Vascular access for Elderly Hemodialysis Patients

ORIENTADOR

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Abstract

Introduction: Arteriovenous Fistulas have been massively considered as the gold-standard vascular access in Hemodialysis starting patients. Although data shows AVFs as the best method overall, in older patients some contradiction has been noted. Therefore, rises the question, are still AVFs the best method for elderly patient's treatment? And if so, why?

Methods: Creation of this paper was based on data gathering. Through pubmed's search engine, we looked for English written articles discussing the topic of Hemodialysis vascular access in the elderly. Articles on access comorbidities and outcomes were also included. Studies prior to the year 2000 were excluded.

Results: The association between old age and high cardio-vascular comorbidity rates is linked to poorer fistula maturation. Poor out-comes and low life-expectancy leads to the belief that fistulas may not be recommended for elder patients. However, contradictory studies make it impossible to come to a proper conclusion. Still, most authors seem to agree that proper patient guidance during and prior to Hemodialysis treatment transition, may lead to better access selection and better fistula outcome. Vascular examination with ultrasound technics and well timed vascular access creation (6-9 months before treatment) are also associated to better fistula success. Also, proximal fistula creation (braquial-cephalic), was deemed better for older populations when compared to distal fistula creation, due to more significant patency.

Conclusion: Due to antithetical results, arteriovenous fistulas may not be disregarded as the primary access for HD treatment in the elder population, and fistula creation should still be carried-out in these patients. Nevertheless, patient treatment individualization is key and non-maturation risk factors should be searched and considered, as well as poor life-expectancy and bad vasculature.

Key words: Arteriovenous fistula, Elderly, Hemodialysis, Treatment failure, Vascular access.

Introduction

Since 2003, the Fistula First Initiative has been one of the major deciding factors while choosing the vascular access for initiating Hemodialysis (HD) treatment [1]. Since then most guidelines suggest Arteriovenous Fistulas (AVF) as the gold-standard access for all patients beginning HD worldwide [2]. Despite the increased numbers of Fistulas created, elder patients treated with HD continue to have high mortality rates, independently of vascular access[3]. Relation between age and mortality is unequivocal, still questions regarding current vascular access methods in elders have since been raised [4].

Methods

A diverse literature search was made using Pubmed's(U.S. National Library of Medicine), in order to identify relevant articles on the topic of vascular access in the elderly beginning hemodialysis. Arteriovenous fistula and arteriovenous graft were used as keywords, as well as hemodialysis, elderly and chronic kidney failure. Studies on access and technic comorbidities were also included. Enlgish written articles were preferred due to linguistic barriers. Studies prior to the year 2000 were excluded from the selection. Moreover, copies of the papers were acquired on electronic format from the retrieved journals, in order to enhance the search for information on the topic.

Vascular Access Choice

When choosing between the available vascular access for patients starting HD, AVFs are the preferable option. Fistulas have been associated with a better life-span, lower rates of hospitalization and infection in comparison to arteriovenous grafts (AVG) and central venous catheters (CVC) [5, 6]. The difference in methods, their contradictions and indications have long been a known fact and because of that AVFs have been considered as the more favourable method and gold-standard treatment [2]. However, recent studies showed a lack of benefit in fistula creation in the elderly population, which contradicts HD treatment guidelines[7-10]. DeSilva et al, compared data from a cohort of 115,425 HD patients > 67 years old and failed to show a statistical difference between fistula and AVG usage in patients older than 80 [7]. Other studies even claim that "high

risk patients may benefit from permanent central vein catheters" or "long term catheters" [11, 12]. Disparity in results and contradictions to the Fistula First Program, creates doubt in clinical decision, specifically in this group of patients. So, we may question, what's the preferred method for elders beginning HD?

The importance behind likewise questions regards not only the well-fare and outcome of patients, but also the proper and beneficial management of hospital resources, that are in high demand due to the increase in the HD population [1]. Moreover, divergent data questions the reliability of AVFs as the preferred treatment and the Fistula First Program itself. Furthermore, current guidelines lack orientation on the matter, suggesting only that individualized AV planning may lead to a better outcome in elder patients, without a specific answer on the preferable method for the older patients [13].

One thing is certain, lack of success in the elderly is mostly associated to an increased AVF maturation failure[8, 13, 14].

AVF failure

Many variables have been correlated to an increase in Fistula failure. Metabolic syndrome, Diabetes [15], Atherosclerosis, thrombosis, female sex[16] and black race [17], make some of the most important [18-20]. It isn't hard to relate most of the previously referred criteria to old age. Older people are largely associated with increased levels of cardiovascular comorbidities, making it easy to justify the difficulty in AVF creation in this group. Additionally, older age seems to increase AVF failure independently of other risk factors. Mauricio Monroy-Cuadros et al, studying a cohort of 831 patients after AVF creation, disclosed that the risk of AVF failure is similar, independently, for age, Diabetes, Hypertension and peripheral vascular disease (RR: 2.4-2.5). More than that, results show a 16 times risk increase in patients with low initial intra-access blood flow, that is also linked to age related comorbidities like atherosclerosis and Peripheral vascular disease(PVD) [21].

PVD and low initial intra-access blood flow, are highly associated to peripheral hypoperfusion. As previously referred, poor peripheral vasculature has the highest risk of AVF non-maturation and higher chance of thrombosis [21]. Regarding this information, a proper vascular examination is required in HD starting patients, especially in the elderly [13]. Thus, recommendation for ultrasound vascular exams to be carried on in these

patients. Artery and Venous calibre should be considered, such as flow rate and any vascular turbulence due to atherosclerosis, since any of previous factors may question the maturation of the fistula.

Due to vascular abnormalities and deficient patency, in the elder vasculature, location of the vascular access is also key for a proper maturation. Most researchers seem to agree that proximal fistula is related to better success rates. This might be attributed to the higher calibre and blood flow of the vessels. So, according to the previous information braquiocephalic fistula are preferred to radiocepahalic. Braquiocephalic access has a better life-span and a lower failure percentage. Indeed studies show a better outcome when patients receive a braquiocephalic access [22, 23]. This association is specially well founded for older patients due to PVD [21].

Certainly, the previous factors make the requirement for proper clinical evaluation in elders starting HD highly understandable and expected.

Proper care in access creation

Thorough examination and overview are beneficial not only for the overall patient's well-being but for fistula creation as well. All HD patients seem to benefit from a prior well guided follow-up, which is essential for proper access creation[8, 10, 14, 24].

Deciding when and if HD should start is also dependent on a good follow-up. A well-founded decision to begin treatment prior to terminal kidney disease may prevent life-threatening events and increase life-expectance as well as quality of life. It is also important to explain and discuss with patients the preferred method of treatment, including vascular access, since access outcome is dependent of the patient's cooperation and understanding.

Timing of access creation is also a fundamental factor in lowering fistula and graft failure rates. Proper timing may be the difference between fistula maturation and non-maturation, more so in elders. Studies show that too early access creation (> 12 months) may be prejudicial[25, 26]. Tammy Hod et al, relates a slight increase in Fistula maturation when access creation is started 6 to 9 months prior to HD[25]. However, due to the difficulty in predicting CKD evolution, most patients still don't start access creation in this

time range and continue to be subjected to fistulas with not enough time for proper maturation.

Overall recommendations suggest that AVF should always be considered, independently of age. However, individuality should also be considered, especially in the elderly, high comorbidity, low life-span patients. Some seem to agree that patients with less than 24 months of life-expectancy don't benefit from AVF creation, due to low maturation rates [27]. Still, one may question this statement due to the variability and difficulty in predicting life-expectancy.

Conclusion

In conclusion, the lack of agreement on the subject makes it impossible to distinguish the best vascular access for the elderly, with the data available so far. Knowing this, it is essential that further, more specific study on the topic is conducted. However, the huge majority of authors agree that therapy should be individualized, due to the high comorbidities present and that AVFs, with the available data, should still be tried out as treatment for elder patients[21, 28-33].

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3. Capítulo em livro

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